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CLIMATIC FEATURES OF THE ERRINUNDRA PLATEAU, EAST GIPPSLAND

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Abstract: This paper documents some hitherto unpublished, medium-term climatic data from the Errinundra Plateau, a region of considerable ecological significance in East Gippsland, Victoria.

The mean annual rainfall for the period 1971 to 1981 (inclusive) was 1779 mm, evenly distributed throughout all months of the year, making this area one of the wettest locations in Victoria. The expected annual rainfall, based on a correlation with 97 years of records at Orbost, is 1770 mm, though total annual rainfall varied from 1187 mm in 1972 to 2720 mm in 1974. Snow is common every winter, but usually does not last on the ground for more than a few weeks.

Mean daily maximum temperature over the 11-year period ranged from 20.5°C in February to 6.4°C in July, and mean minimum temperatures from 9.4°C in February to 0.3°C in August. The mean annual number of frosts was 137, with 68 of these being severe, and frosts were recorded in all months of the year.

Comparisons are made between the Plateau data and that from other Victorian sites of comparable elevation, and some possible effects of the climate on a disease outbreak and vegetation are discussed.

The climate of the Errinundra Plateau has at least three features that make it quite different from other areas of similar elevation in Victoria, *viz.* mean annual rainfall is higher, rainfall is more evenly distributed over the year, and frost frequency is higher.

Most weather stations in East Gippsland (eastern Victoria) are situated along the coast or in settled areas along river valleys; hence little is known about the climate of the more mountainous regions further inland [Land Conservation Council (LCC) 1974; Linforth 1969, 1976]. Eleven years of records are now available from a weather station established during 1971 on the Errinundra Plateau, in the mountainous region of East Gippsland. This paper summarises the results of the records collected, and gives a brief, comparative description of the climate and its possible influence on the development of a foliar disease outbreak in 1974, and on the unique vegetation of the Plateau.

STUDY AREA

Physiography, Geology and Soils

Forming the southern tip of the Monaro Tablelands, the Errinundra Plateau consists of about 10 300 ha of undulating land bordered by steep escarpments to the south-east and west. The Plateau includes the Goonmirk Range and the peaks of Mt Morris, Cobbs Hill and the Goonmirk Rocks (Fig. 1). It is separated from the Central Highlands of Victoria and the Great Dividing Range by the Snowy and Tambo River valleys (Fig. 1). In this paper, the Errinundra Plateau is defined as the area that is mostly above 1000 m elevation, south of 37° 10′ S latitude and between 148° 45′ and 149° 00′ E longitude (Fig. 2), but excluding Mt Ellery.

The majority of the Plateau falls within the Errinundra Land System which is part of the Bonang Land Zone (LCC 1974). Bedrock is composed of Ordovician sediments, with some Upper Devonian granodiorite at the Goonmirk Rocks and in the south-west. Most of the soils are fertile, friable, reddish or brownish, and have a gradational profile (LCC 1974). Deep humus layers occur under mature forests.

Vegetation

The Plateau is entirely forested, with tall (> 50 m) eucalypt forest predominating. The principal species is *Eucalyptus nitens* Maiden (shining gum); and the most extensive stands of this species in Australia occur here. Stands appear to be mostly between 200 and 250 years old and many are pure (K. Piercy and P. W. Woodgate, pers. comm. 1984). In mixed stands the most common associate is *E. fastigata* H. Deane & Maiden (cut-tail); however, associations with *E. delegatensis* R. T. Baker (alpine ash), *E. regnans* F. Muell. (mountain ash), *E. viminalis* Labill. (manna gum) and *E. obliqua* L'Herit. (messmate stringybark) also occur (Ashton 1969, Forbes *et al.* 1982). The stands are commonly associated with tall understorey species, such as *Atherosperma moschatum* Labill. (southern sassafras), *Acacia frigescens* J. H. Willis (mountain wattle), *Elaeocarpus holopetalus* F. Muell. (black oliveberry), *Notelaea ligustrina* Vent. (privet mock-olive), *Telopea oreades* F.Muell. (Gippsland waratah) and *Podocarpus lawrencei* Hook. f. (mountain plum pine), which occasionally occur (without shining gum) as montane closed forest (alternatively termed cool temperate rainforest) in protected gullies (Forbes *et al.* 1982). *P. lawrencei* occurs in tree form 10-12 m high, on the Goon-

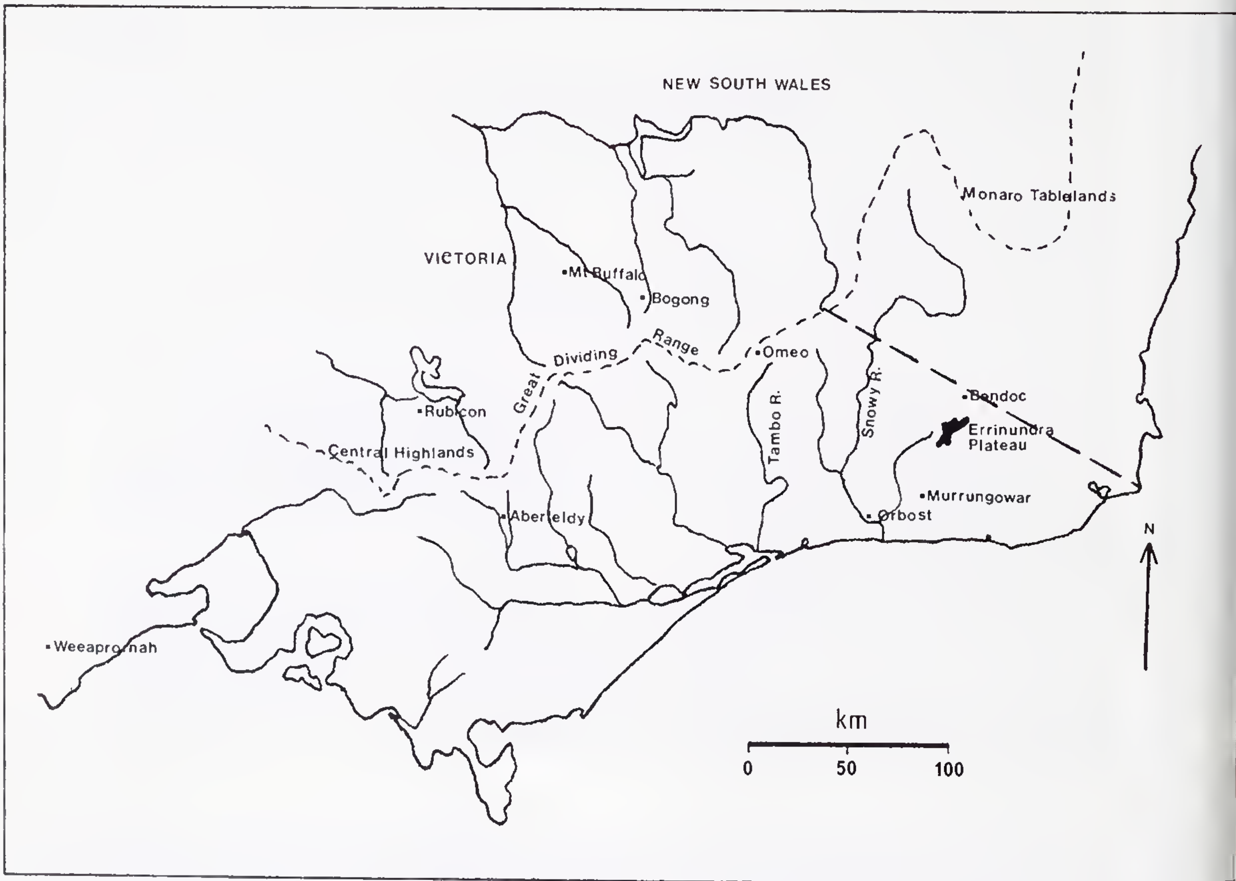

Fig. 1—Location of the Errinundra Plateau in eastern Victoria, and other sites referred to in the paper.

mirk Range, in comparison with its usual occurrence in sub-alpine areas as a prostrate shrub (LCC 1974). Curiously, *Nothofagus cunninghamii* (Hook.) Oerst. (myrtle beech), a common associate of *Atherosperma moschatum* in Tasmania and Victoria's Central Highlands, is absent from East Gippsland (Ashton 1969, Howard & Ashton 1973).

METHODS

The techniques used to collect and analyse the climatic data are described in the following section. Rainfall, air temperature and frost data from stations used for comparison with the Plateau were either provided by the Information Service of the Bureau of Meteorology, Melbourne, or obtained from published data, as referenced.

Rainfall

In January 1971 a standard rain-gauge was set up in a clearing at the south-eastern tip of the Errinundra Plateau (37° 21′ S, 148° 51′ E) (Fig. 2), 1050 m above sea level (number 084132 of the Commonwealth Bureau of Meteorology). The gauge, 500 mm in capacity and with a collecting surface diameter of 203 mm, was positioned on land gently sloping towards the north-west, at a distance of at least twice tree height from the nearest trees. Whenever possible, rain was measured directly after rainfall or at least weekly by one of the authors (FM). In some instances, rain falling late in the month was not measured until early in the following month, though, where possible, this rainfall was allocated to the month in which it fell. Snow and hail melt was included as rainfall.

Drought

There are several methods available by which drought can be measured. The period of record was too short to define drought based on decile values (Gibbs & Maher 1967), lack of evaporation data prevented the use of effective rainfall as a drought index (Linforth 1969), and the recording systems used did not allow the calculation of the Byram-Keetch Drought index (Keetch & Byram 1968). However, the data did allow the use of Foley's method of estimating drought periods (Foley 1957). In this method, each month's rainfall is converted to a value (in 'units') by subtracting the mean rainfall from the actual rainfall and dividing by one thousandth of the mean annual rainfall (1.78 in this study).

For periods of at least four consecutive months whose values (in 'units') were negative (deficient), mean monthly deficiency values were calculated and compared with Foley's scale of values (p. 18) for the Gippsland region, which allows estimation of droughts of high, moderate, or low intensity. For dry periods of 7-9 months, the inclusion of one positive monthly value was allowed

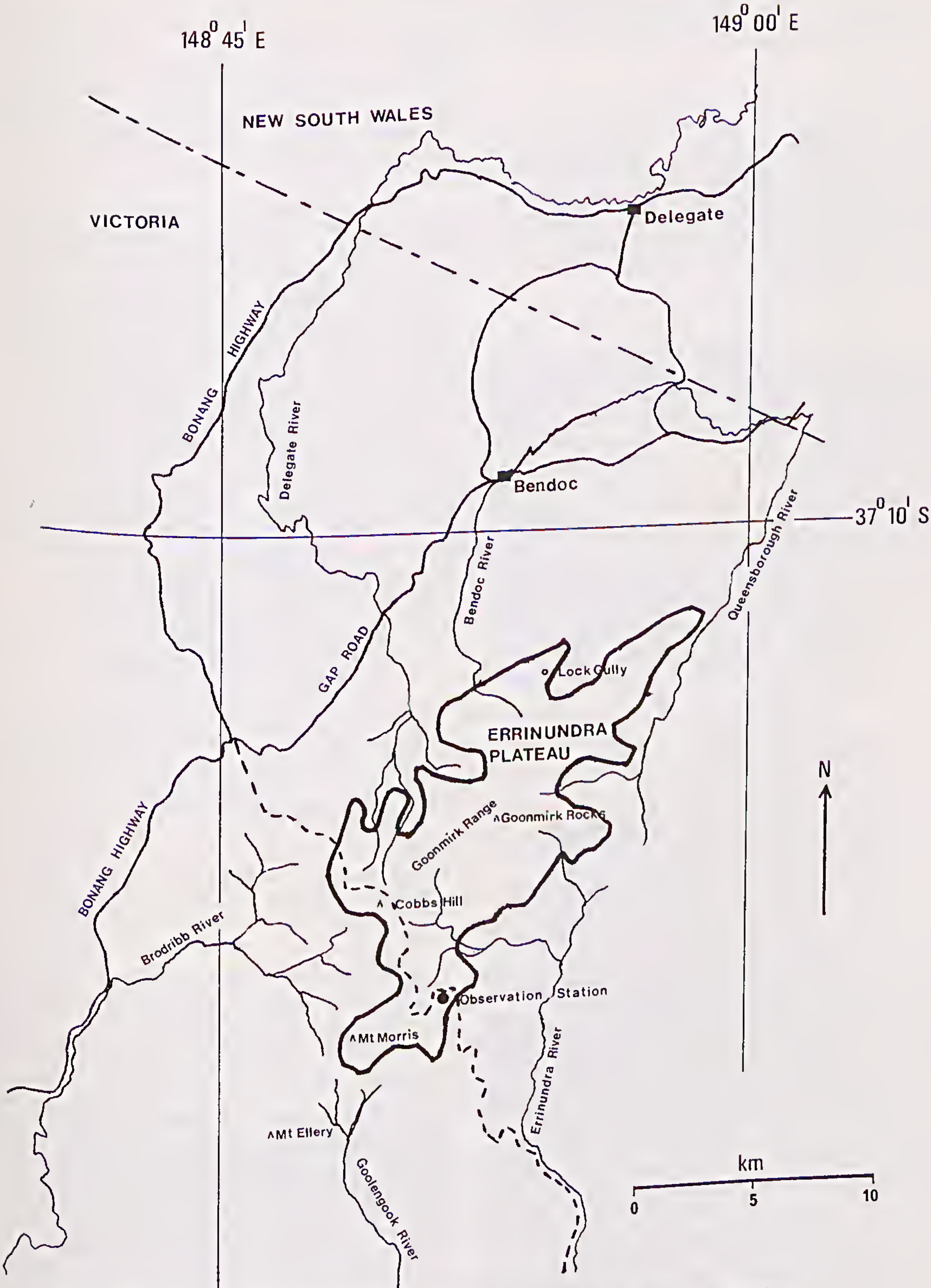

Fig. 2—Errinundra Plateau and surrounds showing the location of the observation station.

amongst the otherwise negative values, and for periods of > 10 months, up to two such values. The longer the period for any given mean monthly deficiency, the more intense the drought.

Temperature

Between February 1971 and January 1982 (with the exception of a 6-month period in 1977 and a 4-month period in 1978, air temperature was firstly measured by a Casella and then by a Lambrecht 7-10 day recording thermohygrograph in a Stevenson screen (1 m above ground level) adjacent to the rain gauge. The daily maximum and minimum temperatures were read from the charts, and means were calculated.

Frost

Daily minimum temperatures were used to calculate data on frost occurrence. A light frost is defined as a screen temperature of 0.1° to 2.2°C, and a severe frost as equal to or less than 0.0°C (Foley 1945). Because the temperature record for some months was incomplete, an expected number of frost days in a month was calculated as follows: the actual number of frost days was divided by the number of days with a recorded minimum and multiplied by the full number of days in that month. The first and last recorded frosts for each year were collated and the median, and the mean deviation from the median, calculated. The number of calendar days between last and first recorded frosts of a season was used as the frost-free period for each summer, although this may have overestimated the frost-free period because of some incomplete recording during the periods.

RESULTS AND DISCUSSION

Rainfall

The mean annual rainfall recorded by the gauge on the Errinundra Plateau for the eleven years 1971-1981 was 1779 mm (Table 1).

Orbost is the nearest station (Fig. 1) with long-term rainfall records inclusive of the 1971-1981 period. The mean annual rainfall recorded at Orbost over this period was 852 mm, compared with a 97-year mean of 845 mm. There was a good correlation between annual rainfall on the Plateau and that recorded in Orbost ($r^2=0.70$). Using this correlation to estimate the 97-year mean for the Plateau gave an expected annual rainfall of 1770 mm, with a range between 1600 and 1940 mm ($P<0.05$). On isohyet maps, the mean annual rainfall of the Plateau has previously been significantly under-estimated as 1000-1100 mm (Linforth 1976) and 1400-1600 mm (LCC 1974, Adomeit *et al.* 1984). These general estimates, based on extrapolation, were probably low due to the scarcity of surrounding recording stations and possibly to unrecognised orogenic effects. The escarpments of the Plateau would cause significant rising of winds from the west and south-east, which would result in much increased precipitation compared with nearby places, such as Bendoc and Murrungowar. The Errinundra Plateau is considerably wetter than the next wettest rainfall recording station in East Gippsland, Murrungowar (Fig. 1), which has a mean annual rainfall of 1019 mm. There are only six stations in Victoria recording a higher annual average rainfall than 1770 mm, three of these being in the Otway Ranges (e.g. Weeaproinah—1934 mm), Mt Buffalo Chalet (1928 mm), Falls Creek (2652 mm) and Bogong (1834 mm) (see Fig. 1). However the Plateau is wetter than several other montane recording stations, such as Rubicon (1618 mm), Aberfeldy (1091 mm) and Bendoc (992 mm) (Bureau of Meteorology 1977).

The mean monthly rainfalls show a fairly even distribution of rainfall throughout the year (Fig. 3). This even, seasonal distribution is a feature of the rainfall pattern in other parts of East Gippsland (Linforth 1976). Fig. 4 compares the seasonal rainfall at Errinundra Plateau with that at two rainfall stations of similar elevation in the Victorian Central Highlands—Rubicon and Aberfeldy. Rubicon shows a distinct winter maximum whereas the Plateau and Aberfeldy show only slight winter maxima and a higher proportion of summer rainfall.

Severe hail storms have been experienced on the Errinundra Plateau in all seasons. Snow falls every winter but usually does not lie on the ground for more than a few weeks, though during winter 1974 snow lay continuously for three months over most of the Plateau. As the Plateau is often shrouded in fog, fog-drip from vegetation would contribute to the precipitation received, although it was not measured in this study.

Table 1

Annual Rainfall on the Errinundra Plateau, East Gippsland, 1971-81.

Year	Rainfall (mm)
1971	2010
1972	1187
1973	1672
1974	2720
1975	1873
1976	1963
1977	1690
1978	2366
1979	1191
1980	1345
1981	1547
Mean	1779
Median	1690

Drought

Drought periods, as estimated by the Foley (1957) method (Table 2), were surprisingly, somewhat frequent on the Errinundra Plateau (6 in 11 years), given the high mean annual rainfall. However, there was only one period (March 1972—July 1973) which was classed as of high intensity. During this 17-month period, there were up to 39 consecutive days without rain and, although the rainfall totalled 1520 mm, wilting of understorey species was observed towards the latter part of the period. Together with the 1971 dry period, this drought (which also occurred throughout the rest of East Gippsland) was probably a significant factor in the unsatisfactory eucalypt regeneration results in the high elevation forests of East Gipps-

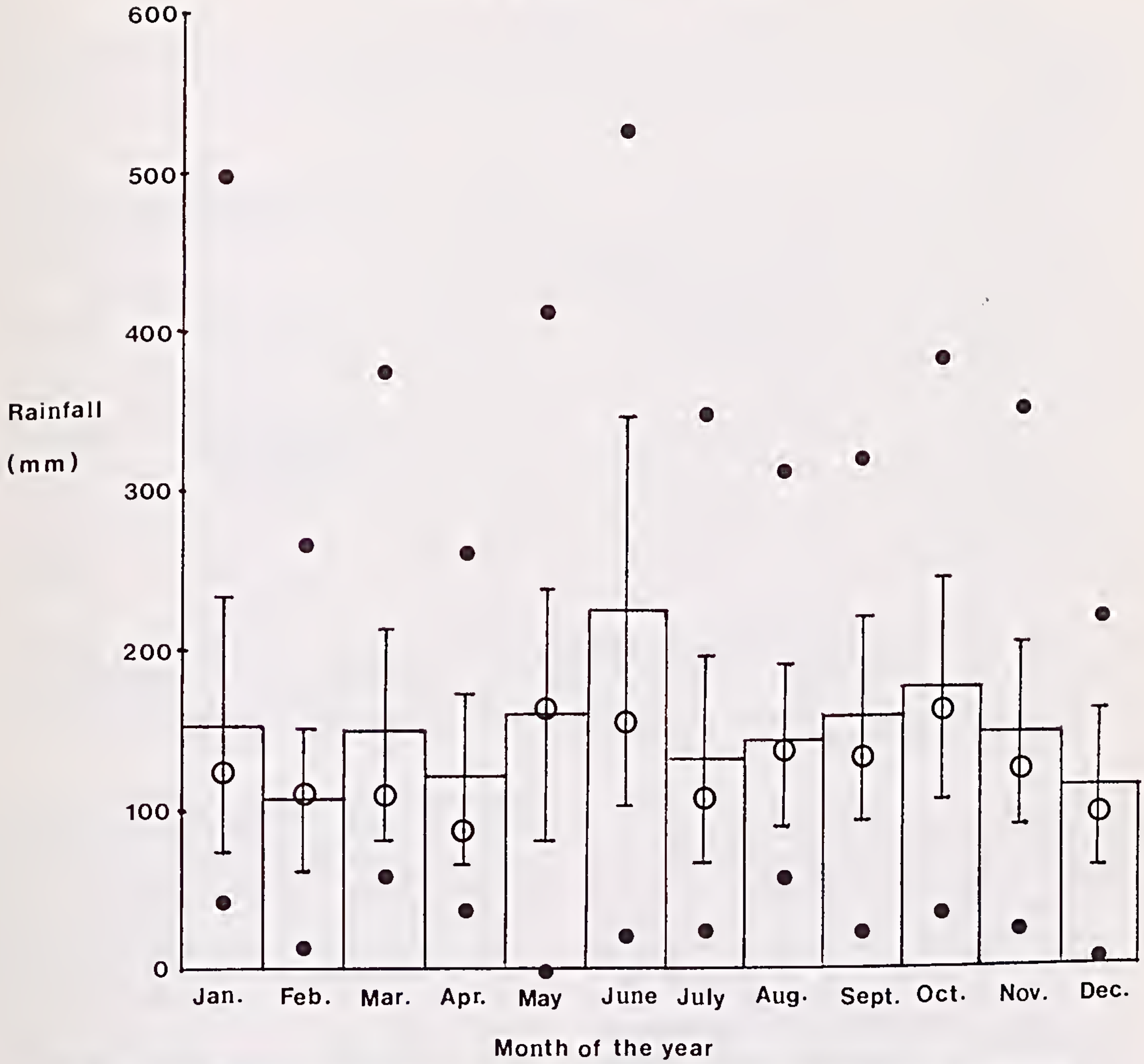

Fig. 3—Mean monthly rainfalls recorded on the Errinundra Plateau, showing confidence limits of the mean ($P < 0.05$) (I), the highest and the lowest rainfalls ever recorded for each month (●), and the median values (○), for the period 1971-1981.

land in the early 1970's (P. C. Fagg, unpubl.). The significance of the later (low to moderate) droughts is difficult to judge, although it is likely that a general reduction in vegetation growth would have occurred, particularly when the dry periods extended into the main growing period (October—April).

Foley's (1957) three scales for Victoria show that the wetter the region the smaller the number of units that correspond to a drought of given intensity and duration. Thus, Foley's intensity scale for Gippsland (Foley, op. cit. p. 18) is probably conservative in relation to the Errinundra Plateau, as it was based on rainfall data from drier localities (Warragul, Rosedale, Sale, Maffra, and Bairnsdale).

Temperature

Temperatures for the Errinundra Plateau are compared with those for Bendoc, Aberfeldy and Rubicon (Bureau of Meteorology 1975) in Table 3. Although the Bendoc records are limited, the Errinundra Plateau appears to have a more equable climate than Bendoc, 21 km to the north (Fig. 2), i.e. mean daily maxima are lower and mean daily minima are higher on the Plateau. The lower maxima are probably due to the greater elevation of the Plateau, whereas the minima could be higher because the Plateau is less affected by cold air drainage at night than Bendoc, which is located in a river valley. The lowest temperature recorded was −7.8°C, which occurred during a period of 34 consecutive nights of ≤ 2.2°C during July and August 1971. The lowest maximum, minus 1.0°C, was recorded on 5 August 1974.

The temperatures recorded on the Errinundra Plateau are very similar to those recorded at Aberfeldy; both sites have similar elevation, which is probably the most important factor in determining daily temperatures. Rubicon, in the Central Highlands, is at a lower elevation than the Plateau and is much warmer throughout the year.

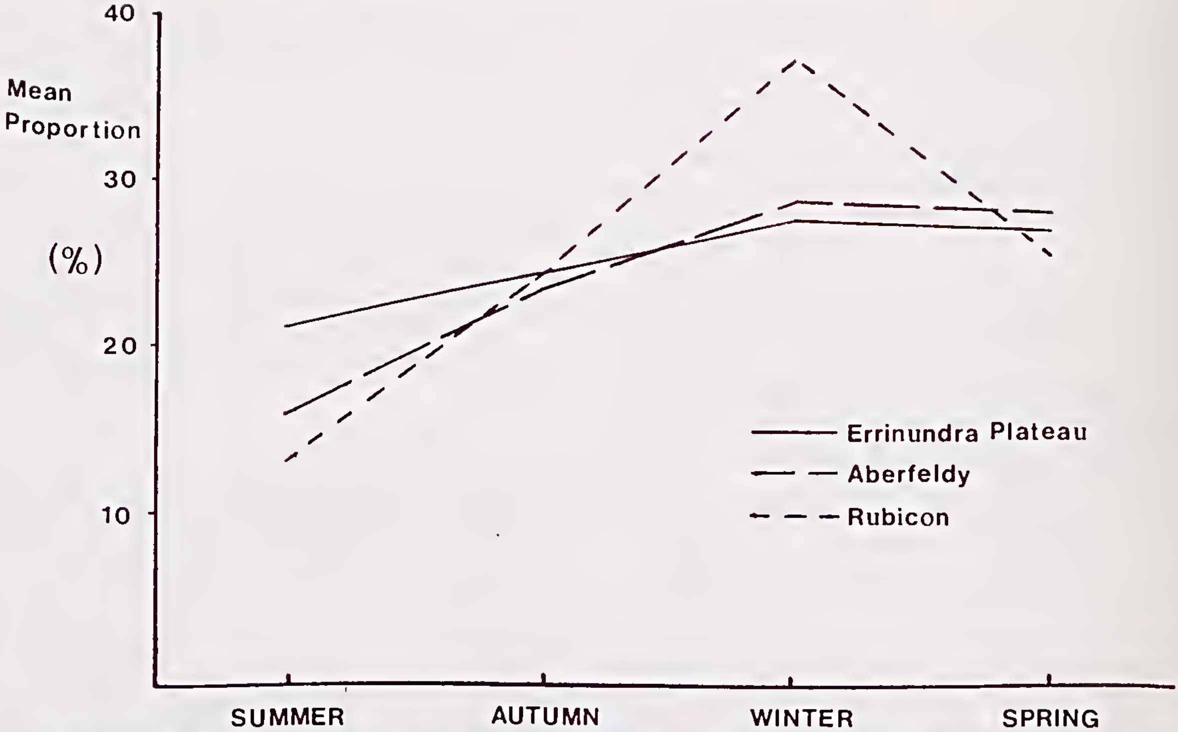

Fig. 4—Mean proportions of annual rainfall received each season at Errinundra Plateau (East Gippsland), and Aberfeldy and Rubicon (Central Highlands), for the periods of record (Table 4).

Frost

The results from the frost occurrence data are compared with those for Omeo, Aberfeldy and Rubicon, in Table 4. There was a mean of at least 14 frosts per month in the period May—September, and frosts were recorded in all months of the year. The Errinundra Plateau experiences more frosts (a mean of 137 per year) than Omeo, Aberfeldy and Rubicon, although Omeo experiences slightly more severe frosts (72) than the Plateau (68). The Plateau tends to have more spring frosts (35) than the other three stations, whereas Omeo has the most autumn frosts (29). Aberfeldy has a longer light frost (≤ 2.2°C) season with a short mean frost-free period (27 days), but a shorter severe frost (≤ 0.0°C) season than the Errinundra Plateau. Both Aberfeldy and the Plateau show a large mean deviation in the timing of the first light frost for the year, and the Plateau also has an extremely varia first severe frost, *viz.* the median date of occurrence the first severe frost for the year is 16 April, although mean deviation from this date is 44 days.

An extremely cold spell occurred at the Errinun Plateau during 1971, with 41 consecutive frosts du June and July and a further 34 consecutive frosts du July and August. In 1975, a temporary weather stat was established at the northern end of the Plateau at L Gully, elevation 1080 m (Fig. 2), and records were k until 1978. During that period a mean of 146 frosts year was measured (Fagg, unpubl.). During the sa period at the Errinundra Plateau station, 113 frosts year were expected to have occurred. This difference m reflect the fact that the Lock Gully station was in an posed location, compared with the Plateau station wh

Table 2
Duration and Intensity of Drought Periods Recorded on the Errinundra Plateau, East Gippsland, 1971-81.

Period (inclusive)	Duration (months)	Mean Monthly Rainfall Deficiencies (units*)	Drought Intensity†
March-October 1971	8	22.4	low
March 1972-July 1973	17	34.4	high
April-July 1976	4	43.6	moderate
August-November 1978	4	35.2	low
June 1979-April 1980	11	29.8	moderate
August 1980-July 1981	12	25.6	moderate

* calculation of units is described on p.90
† from Foley (1957)

TABLE 3

MONTHLY MEANS OF DAILY MAXIMUM AND MINIMUM TEMPERATURES, AND EXTREME TEMPERATURES (°C) FOR THE ERRINUNDRA PLATEAU AND BENDOC, EAST GIPPSLAND, AND ABERFELDY AND RUBICON, CENTRAL HIGHLANDS, VICTORIA.

Station (period of record) (elevation)	Temperature parameter	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Errinundra Plateau	Highest	35.8	33.2	29.4	23.2	18.9	17.8	14.0	16.1	27.8	26.1	31.3	32.2
(1971-1981)	Mean maximum	20.3	20.5	16.7	13.0	10.3	6.8	6.4	6.4	10.6	12.8	14.8	18.6
(1050 m)	Mean minimum	9.1	9.4	7.7	5.3	3.1	1.1	0.5	0.3	2.4	3.8	5.1	7.4
	Lowest	−0.2	−2.2	−2.8	−3.2	−3.9	−5.6	−6.7	−7.8	−5.6	−5.0	−4.2	−4.4
Bendoc	Highest	33.2	33.5	33.3	26.1	24.5	19.4	15.0	18.4	26.4	25.2	26.7	29.8
(1965-1967)	Mean maximum	22.6	24.2	21.5	17.0	13.7	10.8	9.1	10.4	13.9	17.2	19.2	23.3
(914 m)	Mean minimum	7.3	8.4	5.3	2.6	0.0	−1.5	−2.4	−1.0	0.9	3.8	3.5	7.8
	Lowest	−4.4	1.7	−1.1	−6.9	−8.3	−8.9	−9.7	−6.4	−6.7	−6.4	−5.0	−1.7
Aberfeldy	Highest	32.0	28.9	26.5	21.7	18.3	15.0	12.0	15.6	19.5	21.1	23.9	30.0
(1969-1974)	Mean maximum	20.2	20.5	16.9	14.0	9.8	6.7	6.0	6.2	9.5	12.7	14.8	18.5
(1067 m)	Mean minimum	9.0	10.4	7.4	6.2	3.3	1.0	0.4	0.3	1.8	3.7	5.2	7.8
	Lowest	0.6	2.8	0.0	−1.1	−1.7	−5.6	−5.6	−7.0	−5.0	−3.9	−1.1	0.0
Rubicon	Highest	37.5	36.7	32.9	25.7	20.5	16.8	16.7	18.5	23.9	26.3	32.9	32.9
(1957-1983)	Mean maximum	23.9	23.1	20.4	15.5	10.6	8.4	7.0	8.4	11.0	14.6	17.8	20.7
(838 m)	Mean minimum	12.3	12.1	10.6	8.0	5.1	3.5	2.3	2.9	4.0	6.2	8.2	10.2
	Lowest	2.4	2.8	0.1	0.0	−2.0	−2.6	−2.8	−5.6	−2.9	−1.7	−0.4	1.0

is less exposed. However, it is often difficult to account for differences in frost frequency. An exposed location may be subject to more wind and have fewer frosts, whereas a sheltered location may have more still air and thus more frosts (D. J. Linforth, pers. comm.). Nevertheless, this comparison serves to indicate some of the variability in measured frost frequency that occurs at different sites on the Plateau.

INFLUENCE OF RAINFALL ON AN OUTBREAK OF *Aulographina eucalypti*.

Following a severe defoliation of mature *E. nitens* on the Plateau during the period October—December 1974, for which the principal causal agent was *Aulographina (Thyrinula) eucalypti* (Cooke & Mass.) von Arx & Muller (corky leaf-spot) (Neumann & Marks 1976), the records of the Errinundra Plateau station were used to investigate the weather conditions preceding the defoliation. Although the monthly temperatures in this period did not differ greatly from the mean monthly temperatures, there were seven months of high rainfall preceding and including the month (October) when the defoliation was first observed. A total of 2097 mm of rain fell between 1 April and 31 October 1974, which is 189% of the mean rainfall for those months and is the highest total rainfall for these months in the period of record. There is a possibility that these extremely wet conditions played some part in the epidemiology of this outbreak of *A. eucalypti* on the Plateau. This suggestion is supported by the recent evidence that ascospore release from leaf lesions caused by *A. eucalypti* occurs most readily under conditions of high irradiation and abundant moisture, such as provided by daytime rains (Wall & Keane 1984).

INFLUENCE OF FROST, RAINFALL, AND TEMPERATURE ON THE VEGETATION OF THE ERRINUNDRA PLATEAU.

The fact that *Eucalyptus nitens* is one of the most frost-hardy of the eucalypts (Turnbull & Pryor 1978), may, at least partly, account for its excellent development in the forests on the Plateau where frost frequencies are relatively high (Table 4). The other occurrences of *E. nitens* in Victoria are in discontinuous stands further west (Central Highlands) (Pederick 1976). In a trial testing early height growth and frost hardiness of 49 provenances of *E. regnans*, the provenance from the Errinundra Plateau was the most frost-tolerant (Griffin *et al.* 1982). This further indicates adaptation (or tolerance) within the eucalypt species on the Plateau to high frost frequencies.

The generally reliable annual rainfall distributed evenly throughout the year would indicate that wildfires may be less frequent on the Plateau than in mountainous regions that experience relatively dry summers, e.g. the Rubicon area. In fact, the most recent wildfire that affected parts of the Errinundra Plateau was as long ago as January 1939. Preliminary ring-counting studies at four sites on the Plateau (Piercy & Woodgate, pers. comm. 1984) have indicated that approximately seven wildfires have occurred in the past 252 years at intervals ranging from 8 to 79 years, although the interval between fires at any *one* site may have been much longer than 79 years. This is a significantly lower frequency than that found in most other forest areas in south-eastern Australia (averaging one year in 7–10 years) (Luke & McArthur 1978).

The absence of *Nothofagus cunninghamii* on the Plateau, despite the fact that many species, e.g. *Atherosperma moschatum*, which are closely associated with it in other parts of its range are present, does not

TABLE 4
FROST OCCURRENCE ON THE ERRINUNDRA PLATEAU AND AT OTHER HIGH ELEVATION SITES IN VICTORIA.

Parameter	Errinundra Plateau		Omeo*		Aberfeldy*		Rubicon	
Elevation (m)	1050		650		1067		838	
Period of record	1971-1982		1927-1975		1969-1974		1957-1978	
First light frost (≤2.2°C)								
Median date	13 Mar.	(36)†	16 Feb.	(26)	11 Jan.	(40)	27 Apr.	(18)
Earliest date	1 Jan.		2 Jan.		2 Jan.		14 Mar.	
First severe frost (≤0.0°C)								
Median date	16 Apr.	(44)	6 Apr.	(16)	28 Apr.	(15)	6 June	(18)
Earliest date	20 Jan.		16 Jan.		30 Mar.		30 Apr.	
Last severe frost (≤0.0°C)								
Median date	27 Oct.	(19)	14 Nov.	(25)	27 Oct.	(12)	19 Sept.	(14)
Earliest date	16 Dec.		26 Dec.		26 Nov.		11 Nov.	
Last Light Frost (≤2.2°C)								
Median date	14 Dec.	(14)	10 Dec.	(31)	15 Dec.	(14)	13 Nov.	(14)
Earliest date	31 Dec.		31 Dec.		26 Dec.		20 Dec.	
Mean frost-free period (days)	89		68		27		197	
Mean frost frequency								
	≤2.2°C	≤0.0°C	≤2.2°C	≤0.0°C	≤2.2°C	≤0.0°C	≤2.2°C	≤0.0°C
January	1.1	0.2	0.8	0.1	0.6	0.0	0.0	0.0
February	0.6	0.2	0.7	0.1	0.0	0.0	0.0	0.0
March	2.9	0.8	2.8	0.6	1.4	0.2	0.0	0.0
April	8.1	2.6	9.5	4.4	2.8	0.8	1.0	0.0
May	14.4	6.2	16.8	10.4	7.8	3.2	4.0	1.0
June	22.1	12.4	19.4	13.5	20.0	11.2	9.0	2.0
July	23.9	15.1	23.0	16.2	22.6	14.8	16.0	4.0
August	26.3	14.8	21.6	13.7	19.0	12.0	13.0	3.0
September	16.7	7.4	13.7	8.3	13.6	7.0	8.0	3.0
October	11.3	5.6	7.6	3.1	11.0	4.0	4.0	0.0
November	7.1	2.9	4.1	1.4	3.4	1.0	2.0	0.0
December	2.7	0.2	1.8	0.4	1.0	0.0	0.0	0.0
Total	137.2	68.4	121.8	72.2	103.2	54.2	57.0	13.0

* Bureau of Meteorology (1976)
† Mean deviation around median date (days)

appear to be caused by unsuitable climatic conditions. For 10 of the 12 climate parameters listed by Busby (1986) as a "climate profile" for *N. cunninghamii*, the Errinundra Plateau fits comfortably within the stated ranges. It is likely that Busby's (1986) conclusion, that montane East Gippsland was "at best, marginal for *N. cunninghamii*, with very low winter minimum temperatures, low winter precipitation, and most seasonal temperature ranges higher than otherwise experienced by *N. cunninghamii*", was based on data from nearby stations such as Bendoc that have a colder (Table 3) and drier climate that the Errinundra Plateau.

Howard and Ashton (1973) concluded that the absence of *N. cunninghamii* on the Plateau could be due to its relatively poor powers of seed dispersal. The fire frequency and soil types on the Plateau are not likely to be limiting factors (Howard & Ashton, 1973). We suggest that it is possible that *Elaeocarpus holopetalus* is occupying the ecological niche of *N. cunninghamii*, as both species are of similar form and size, and grow in sheltered, damp sites.

The two vegetation types that are most common on the Errinundra Plateau, cool temperate rainforest and tall wet sclerophyll forest (Forbes *et al.* 1982), appear to flourish with the combination of high regular rainfall, suitable temperatures, and fertile soils. Their excellent development is clear evidence of a very favourable climate for these vegetation communities.

CONCLUSIONS

The climate of the Errinundra Plateau has at least three features that make it quite different from most other areas of similar elevation in Victoria, *viz.* (i) mean annual rainfall is higher; (ii) rainfall is more evenly distributed throughout the year; and, (iii) frost frequency is higher. Some other stations have one or two of these features, yet no others, to our knowledge, have all of these features. In addition, there could be other features, not measured in this study, such as fog and snow frequencies, that further emphasise the uniqueness of the climate on the Plateau. Despite the high mean annual rainfall, drought periods occur from time to time, though severe droughts are rare.

The abnormally high rainfall on the Errinundra Plateau in the period leading up to October 1974 probably promoted the 1974 outbreak of corky leaf-spot disease on *E. nitens*.

The high frost frequency on the Plateau is probably at least partly responsible for the frost-hardiness of the Errinundra provenance of *E. regnans* and for the extensive occurrence of *E. nitens*. The absence of *N. cunninghamii* does not appear to be due to unsuitable climatic factors. The excellent development of cool temperate rainforest and wet sclerophyll forest on the Plateau is evidence of a very favourable climate for these communities.

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